

## **REMARKS**

In the Office Action mailed April 7, 2004, the Examiner noted for the Applicant the recommended section headings for an application, and noted that the specification as filed contains several grammatical and idiomatic errors, and that careful revision was required. The Applicant is tendering herewith a substitute specification to add section headings and to address the grammatical and idiomatic errors identified by the Examiner, generally, and the Applicant's counsel states that no new matter is being added thereby, as only grammatical and idiomatic errors have been addressed.

Claims 1-4 were rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to recite positive methods. The Examiner will please note that claim 1 has been amended to now recite positive method steps. Therefore Applicant believes that he has addressed these grounds for rejecting claims 1-4.

Claims 1-4 have also been rejected under 35 U.S.C. §103(a) as being unpatentably obvious over Dubanchet et al. in view of Christensen et al. For the reasons that follow, Applicant respectfully traverses this ground for rejecting claims 1-4.

Meat-based products are usually prepared with the inclusion of animal fat that contains a large proportion of saturated fatty acids. The latter are known to be linked to cardiovascular diseases (CVD) as contributing risk factors.

The replacement of animal fat by olive oil in meat-based products is eliminating this risk as olive oil mainly consists of mono-unsaturated and poly-unsaturated fatty acids (mainly oleic acid), which are a contributing factor for preventing CVD's.

Furthermore, olive oil contains unique potent antioxidants, namely polyphenols, which have been extensively reviewed in literature as cardiovascular health promoters. It is worth noting that polyphenols are very sensitive to oxygen and heating, factors which are degrading them. That is why incorporating olive oil in meat-based products must be accompanied by the mildest possible conditions of processing in order to secure the maximum level of the initially contained polyphenols in olive oil.

Nevertheless, the above objective is confronted by two technological difficulties, namely:

- the poor stability of the emulsion of olive oil and the solution of the extracted meat proteins, which phenomenon of oil exudation (de-oiling) is observed in the final products, after thermal processing; and
- the sensitivity of the above mentioned functional components to heating and oxidation.

These difficulties are tackled by the present invention by a specific combination of processing conditions, resulting from scientific research and development experience, so that both the oil exudation is avoided and the nutritional advantages of olive oil are preserved in the final meat products.

The closest document to the present invention is Dubanchet et al. Dubanchet et al. refers to a method of production of meat products without the addition of animal fat and to the usage of vegetable oils (soybean, palm, peanut, sunflower, olive oil, etc.) by pre-emulsifying them with the aid of milk proteins and creating an intermediate component that is thereafter used accordingly in the meat-based products.

Please refer to the Abstract of Dubanchet et al., where it is stated:

**Abstract:** A process for making delicatessen meat products using vegetable fats instead of the traditional animal fats. A predetermined amount of vegetable oil is first heated to a temperature of at least 100° C and a homogeneous mixture is made by incorporating milk proteins into the hot oil.... Then boiling water is added to the mixture and the mixture is stirred to create a stabilizing emulsion (pre-emulsifying the oil). The resulting vegetable fat (emulsion) is used in delicatessen meat products in place of animal fat.

It is obvious that according to this method a pre-emulsification step takes place to create a stabilizing emulsion of the oil (intermediate product) prior to the point that a final cooked meat product is created (second step), which is an indirect incorporation. Said emulsion is an intermediate product, which is subject to a heat treatment of at least 100° C. Milk proteins act as an emulsifier. The ultimate stabilization of the system takes place during the heat treatment (protein denaturation) of another product (delicatessen meat product). Olive oil is thus subjected to two thermal processes.

On the other hand, the method of the present invention proposes a direct incorporation of the olive oil in the meat matrix, a one-step procedure, using a mixture of milk proteins and vegetable proteins as processing aids.

This one-step procedure is of great technological advantage, since milk proteins and vegetable proteins, as well, contribute directly to the creation of a well-stabilized protein gel, primarily consisting of meat proteins (actin, myosin, actomyosin), milk proteins, vegetable proteins and added oil.

The added oil is being dispersed during comminution, forming very small globules in the "meat-emulsion" matrix. There is no need of a heat treatment (risk of oil oxidation).

As a result, fat globules are expected to be coated by a strongly stabilized interface protein film, due to the participation of milk proteins and vegetable proteins as well (emulsifying

and water binding properties). The added oil is being treated under mild conditions (no heat, no strong homogenization, no oxidation, no discoloration).

The above one-step procedure leads to a primarily stabilized structure of the uncooked meat product (stable fat globule entrapment in a stable uncooked protein matrix).

According to the present inventor's experience, such a system results in the formation of a stable heat set protein structure in the final product. Fat exudation is banned.

The production method described in Dubanchet et al. has as an objective the inclusion of olive oil in a watery pre-emulsion, with the aid of milk proteins. To achieve this, high temperatures, intense stirring and the presence of water are necessary:

- high temperature (in excess of 100° C);
- intense high-shear stirring, with no precaution for air entrainment in the blend; and
- addition of boiling water, to high proportion in the oil.

The combination of the above parameters is certainly contributing to accelerated oxidation of polyphenols to degraded, non-antioxidant, by-products. The present inventor's experience shows that treating olive oil according to the method described in Dubanchet et al. reduces the concentration of polyphenols from a level of 150ppm to <5ppm into the pre-emulsion!

By considering the above, which provides for the preservation of the positive health properties of olive oil and therefore the differentiation of the products according to the present invention, against the products achievable by Dubanchet et al., it is demonstrated by the present application that it provides measures that assure the stability and the protection of sensitive functional components of olive oil against degradation.

Specifically, in the present invention a direct embodiment of olive oil is achieved at low temperatures and under vacuum, conditions that suppress oxidation hazards.

The present inventor would like to stress that the present invention tackles the recognized technical problem of phase separation by application of a specific processing sequence, which differs from previous art and Dubanchet et al., and consists of:

- the direct, low temperature, and under vacuum embodiment of olive oil in the mixing phase in combination with the, essentially, simultaneous interaction of all factors, as it was experimentally and consistently discovered that the physicochemical properties of olive oil in the range of 2-4° C tend to favour the objective of the absence of de-oiling.

By the above the method described in the present inventor's observed results, the products manufactured by the present application, as compared to that of Dubanchet et al., are differing from the prior art in both achieved nutritional value and product stability.

According to the Christensen et al. Abstract, that reference provides, "A low calorie meat product comprising a mixture comprising comminuted lean meat and a vegetable fat replacement ingredient comprising dietary fiber and starch."

The aim of Christensen et al. is to create a low calorie meat product in terms of an animal fat replacement using for this purpose lean meat (20-95%) and a vegetable fat replacement ingredient comprising dietary fiber and starch (5-80%) [a key parameter]."

It is obvious that said vegetable fat replacer ingredient is mainly used as a filler in Christensen et al., providing a desirable water holding capacity and in some cases a thermostable gel formation ability, to replace the mechanically removed animal fat from the meat ingredient in the recipe.

Further, Christensen et al. optionally proposes the use of foreign fat (?) (column 5) the content of which being at the most 15% (hamburger) and 10% (non hamburger), respectively.

A comparison between the present invention and the approach of Christensen et al. clearly shows that said inventions have a different technological aim, starting from a different point of view.

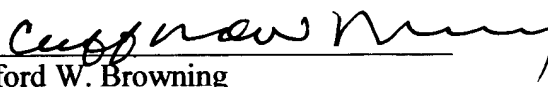
	<b>Present Invention</b>	<b>Christensen et al.</b>
<b>general aim</b>	<b>Replacement of animal fat by olive oil</b>	<b>Replacement of animal fat by vegetable fat replacer ingredient (<u>dietary fiber</u> and <u>starch mixture - filler</u>)</b>
<b>special aim</b>	<b>Emulsification of the added oil globules: use of milk proteins and vegetable proteins ( emulsifiers ) . Incorporation, Stabilization in both intermediate meat product and in the final heat treated meat product: no special portion limits</b>	<b>Use of foreign fat : optional , specified limits, evidently simple entrapment</b>

In regard to the addition of ingredients such as milk protein and starch, mentioned in the Office Action mailed April 7, 2004, the present inventor does recognize that their usage is common knowledge (see Born and Carroll). Usage of these substances is required, according to the method of the present invention, not for replacing meat protein, as they are commonly used, but for their contribution in product stabilization.

In the same spirit, application of vacuum during processing is not mentioned as a novelty, but as a factor for the minimization of olive oil oxidation.

For all these foregoing reasons, Applicant requests entry of the foregoing amendments, consideration of the foregoing remarks, and then allowance of amended claims 1-4 over all the prior art of record.

Respectfully submitted,

By:   
Clifford W. Browning  
Reg. No. 32,201  
Woodard, Emhardt et al. LLP  
Bank One Center/Tower  
111 Monument Circle, Suite 3700  
Indianapolis, IN 46204-5137  
(317) 634-3456

#307028